

# Grid

The Grid system is a comprehensive CSS-based layout framework that provides responsive, mobile-first grid classes for building flexible and adaptive layouts. Based on Bootstrap's flexbox grid system, it includes containers, rows, columns, and extensive flexbox utilities with breakpoint-specific behavior.

## How to use

The Grid system is implemented as CSS classes that can be applied directly to HTML elements. No JavaScript or Angular components are required.

## Basic Grid

Simple grid layout with equal-width columns.

```
&lt;div class="container"&gt;  
  &lt;div class="row"&gt;  
    &lt;div class="col-md-6"&gt;Column 1&lt;/div&gt;  
    &lt;div class="col-md-6"&gt;Column 2&lt;/div&gt;  
  &lt;/div&gt;  
&lt;/div&gt;
```

## Responsive Grid

Grid layout that adapts to different screen sizes using breakpoint-specific classes.

```

<div class="grid-basic-demo">
  <h3>Basic Grid Layout</h3>

  <div class="demo-section">
    <h4>Equal Width Columns</h4>
    <p>
      Basic grid with equal-width columns using the <code>.col</code> class.
    </p>

    <div class="container">
      <div class="row">
        <div class="col">
          <div class="grid-item">
            <h5>Column 1</h5>
            <p>This column automatically sizes to fill available space.</p>
          </div>
        </div>
        <div class="col">
          <div class="grid-item">
            <h5>Column 2</h5>
            <p>This column also automatically sizes to fill available space.</p>
          </div>
        </div>
        <div class="col">
          <div class="grid-item">
            <h5>Column 3</h5>
            <p>All columns in this row have equal width.</p>
          </div>
        </div>
      </div>
    </div>
  </div>

  <div class="demo-section">
    <h4>Fixed Width Columns</h4>
    <p>Grid with specific column widths using numbered classes.</p>

    <div class="container">
      <div class="row">
        <div class="col-8">
          <div class="grid-item primary">
            <h5>Main Content (8/12)</h5>
            <p>This column takes up 8 out of 12 grid columns (66.67% width).</p>
          </div>
        </div>
        <div class="col-4">
          <div class="grid-item secondary">
            <h5>Sidebar (4/12)</h5>
            <p>This column takes up 4 out of 12 grid columns (33.33% width).</p>
          </div>
        </div>
      </div>
    </div>
  </div>

```

```

<div>

<div class="demo-section">
  <h4>Mixed Column Types</h4>
  <p>Combining fixed-width and auto-width columns.</p>

  <div class="container">
    <div class="row">
      <div class="col-6">
        <div class="grid-item">
          <h5>Fixed Width (6/12)</h5>
          <p>This column has a fixed width of 50%.</p>
        </div>
      </div>
      <div class="col">
        <div class="grid-item">
          <h5>Auto Width</h5>
          <p>This column automatically sizes to fill remaining space.</p>
        </div>
      </div>
      <div class="col-auto">
        <div class="grid-item compact">
          <h5>Auto Size</h5>
          <p>Fits content.</p>
        </div>
      </div>
    </div>
  </div>

<div class="demo-section">
  <h4>Container Types</h4>
  <p>Different container types for different layout needs.</p>

  <div class="container">
    <div class="row">
      <div class="col-12">
        <div class="grid-item">
          <h5>Fixed Container</h5>
          <p>
            This uses <code>.container</code> with responsive max-widths and
            centered content.
          </p>
        </div>
      </div>
    </div>
  </div>

<div class="container-fluid">
  <div class="row">
    <div class="col-12">
      <div class="grid-item fluid">
        <h5>Fluid Container</h5>
      </div>
    </div>
  </div>
</div>

```

```

<p>
    This uses <code>.container-fluid</code> for full-width layout
    spanning the entire viewport.
</p>
</div>
</div>
</div>
</div>
</div>

<div class="demo-section">
    <h4>No Gutters</h4>
    <p>Grid without gutters using the <code>.no-gutters</code> class.</p>

    <div class="container">
        <div class="row no-gutters">
            <div class="col-4">
                <div class="grid-item no-gutter">
                    <h5>No Gutter</h5>
                    <p>This column has no spacing between it and adjacent columns.</p>
                </div>
            </div>
            <div class="col-4">
                <div class="grid-item no-gutter">
                    <h5>No Gutter</h5>
                    <p>Adjacent columns touch each other with no gap.</p>
                </div>
            </div>
            <div class="col-4">
                <div class="grid-item no-gutter">
                    <h5>No Gutter</h5>
                    <p>Perfect for seamless layouts and full-width designs.</p>
                </div>
            </div>
        </div>
    </div>

```

<div class="demo-info">

- <h4>Basic Grid Features</h4>
- <ul>
 - <li>
 <strong>Container System:</strong> Fixed-width and fluid containers
 <li>
 <strong>Row Wrapper:</strong> Flexbox rows with automatic gutter management
 </li>
 <li>
 <strong>Column Classes:</strong> Equal-width, fixed-width, and auto-width options
 </li>
 <li>

```
&lt;strong&gt;No Gutters:&lt;/strong&gt; Option to remove spacing between columns  
&lt;/li&gt;  
&lt;li&gt;  
  &lt;strong&gt;Responsive Foundation:&lt;/strong&gt; Mobile-first approach with  
  responsive breakpoints  
&lt;/li&gt;  
&lt;/ul&gt;  
&lt;/div&gt;  
&lt;/div&gt;
```

## Flexbox Utilities

Advanced flexbox utilities for controlling layout direction, alignment, and spacing.

```

import { Component } from "@angular/core";

@Component({
  selector: "app-grid-basic",
  standalone: true,
  template: `
    <div class="grid-basic-demo">
      <h3>Basic Grid Layout</h3>

      <div class="demo-section">
        <h4>Equal Width Columns</h4>
        <p>
          Basic grid with equal-width columns using the <code>.col</code> class.
        </p>

        <div class="container">
          <div class="row">
            <div class="col">
              <div class="grid-item">
                <h5>Column 1</h5>
                <p>This column automatically sizes to fill available space.</p>
              </div>
            </div>
            <div class="col">
              <div class="grid-item">
                <h5>Column 2</h5>
                <p>This column also automatically sizes to fill available space.</p>
              </div>
            </div>
            <div class="col">
              <div class="grid-item">
                <h5>Column 3</h5>
                <p>All columns in this row have equal width.</p>
              </div>
            </div>
          </div>
        </div>
      </div>

      <div class="demo-section">
        <h4>Fixed Width Columns</h4>
        <p>Grid with specific column widths using numbered classes.</p>

        <div class="container">
          <div class="row">
            <div class="col-8">
              <div class="grid-item primary">
                <h5>Main Content (8/12)</h5>
                <p>
                  This column takes up 8 out of 12 grid columns (66.67% width).
                </p>
              </div>
            </div>
          </div>
        </div>
      </div>
    </div>
  `
```

```

    &lt;/div&ampgt
    &lt;/div&ampgt
    &lt;div class="col-4"&gt;
        &lt;div class="grid-item secondary"&gt;
            &lt;h5&gt;Sidebar (4/12)&lt;/h5&gt;
            &lt;p&gt;
                This column takes up 4 out of 12 grid columns (33.33% width).
            &lt;/p&gt;
        &lt;/div&ampgt
    &lt;/div&ampgt
    &lt;/div&ampgt
    &lt;/div&ampgt
    &lt;/div&ampgt

&lt;div class="demo-section"&gt;
    &lt;h4&gt;Mixed Column Types&lt;/h4&gt;
    &lt;p&gt;Combining fixed-width and auto-width columns.&lt;/p&gt;

    &lt;div class="container"&gt;
        &lt;div class="row"&gt;
            &lt;div class="col-6"&gt;
                &lt;div class="grid-item"&gt;
                    &lt;h5&gt;Fixed Width (6/12)&lt;/h5&gt;
                    &lt;p&gt;This column has a fixed width of 50%.&lt;/p&gt;
                &lt;/div&ampgt
            &lt;/div&ampgt
            &lt;div class="col"&gt;
                &lt;div class="grid-item"&gt;
                    &lt;h5&gt;Auto Width&lt;/h5&gt;
                    &lt;p&gt;This column automatically sizes to fill remaining space.&lt;/p&gt;
                &lt;/div&ampgt
            &lt;/div&ampgt
            &lt;div class="col-auto"&gt;
                &lt;div class="grid-item compact"&gt;
                    &lt;h5&gt;Auto Size&lt;/h5&gt;
                    &lt;p&gt;Fits content.&lt;/p&gt;
                &lt;/div&ampgt
            &lt;/div&ampgt
            &lt;/div&ampgt
        &lt;/div&ampgt
        &lt;div class="col-12"&gt;
            &lt;div class="grid-item"&gt;
                &lt;h5&gt;Fixed Container&lt;/h5&gt;
                &lt;p&gt;
                    This uses &lt;code&gt;.container&lt;/code&gt; with responsive max-widths
                &lt;/p&gt;
            &lt;/div&ampgt
        &lt;/div&ampgt
    &lt;/div&ampgt
    &lt;/div&ampgt

```

```

        and centered content.

</p>
</div>
</div>
</div>
</div>

<div class="container-fluid">
<div class="row">
<div class="col-12">
<div class="grid-item fluid">
<h5>Fluid Container</h5>
<p>
    This uses <code>.container-fluid</code> for full-width layout
    spanning the entire viewport.
</p>
</div>
</div>
</div>
</div>
</div>

<div class="demo-section">
<h4>No Gutters</h4>
<p>Grid without gutters using the <code>.no-gutters</code> class.</p>
<div class="container">
<div class="row no-gutters">
<div class="col-4">
<div class="grid-item no-gutter">
<h5>No Gutter</h5>
<p>
    This column has no spacing between it and adjacent columns.
</p>
</div>
</div>
<div class="col-4">
<div class="grid-item no-gutter">
<h5>No Gutter</h5>
<p>Adjacent columns touch each other with no gap.</p>
</div>
</div>
<div class="col-4">
<div class="grid-item no-gutter">
<h5>No Gutter</h5>
<p>Perfect for seamless layouts and full-width designs.</p>
</div>
</div>
</div>
</div>
</div>

<div class="demo-info">

```

```

<h4>Basic Grid Features</h4>
<ul>
  <li>
    <strong>Container System:</strong> Fixed-width and fluid containers
  </li>
  <li>
    <strong>Row Wrapper:</strong> Flexbox rows with automatic gutter
    management
  </li>
  <li>
    <strong>Column Classes:</strong> Equal-width, fixed-width, and
    auto-width options
  </li>
  <li>
    <strong>No Gutters:</strong> Option to remove spacing between
    columns
  </li>
  <li>
    <strong>Responsive Foundation:</strong> Mobile-first approach with
    responsive breakpoints
  </li>
</ul>
</div>
</div>

,
styles: [
  .grid-basic-demo {
    padding: 20px;
    max-width: 1200px;
    margin: 0 auto;
  }

  .grid-basic-demo h3 {
    margin: 0 0 20px 0;
    color: #333;
    font-size: 24px;
    font-weight: 600;
  }

  .demo-section {
    margin-bottom: 40px;
    padding: 20px;
    border: 1px solid #e5e7eb;
    border-radius: 8px;
    background: #f9fafb;
  }

  .demo-section h4 {
    margin: 0 0 12px 0;
    color: #333;
    font-size: 18px;
    font-weight: 600;
  }
]

```

```
}

.demo-section p {
  margin: 0 0 20px 0;
  color: #555;
  line-height: 1.5;
}

.demo-section code {
  background: #f1f3f4;
  padding: 2px 6px;
  border-radius: 4px;
  font-family: monospace;
  font-size: 14px;
}

.grid-item {
  background: #fff;
  border: 1px solid #e5e7eb;
  border-radius: 6px;
  padding: 20px;
  height: 100%;
  min-height: 120px;
  display: flex;
  flex-direction: column;
  justify-content: center;
}

.grid-item h5 {
  margin: 0 0 12px 0;
  color: #333;
  font-size: 16px;
  font-weight: 600;
}

.grid-item p {
  margin: 0;
  color: #666;
  line-height: 1.4;
}

.grid-item.primary {
  background: #e3f2fd;
  border-color: #2196f3;
}

.grid-item.secondary {
  background: #f3e5f5;
  border-color: #9c27b0;
}

.grid-item.compact {
  min-height: 80px;
```

```
padding: 15px;
}

.grid-item.fluid {
  background: #e8f5e8;
  border-color: #4caf50;
}

.grid-item.no-gutter {
  border-radius: 0;
  border-left: none;
}

.grid-item.no-gutter:first-child {
  border-left: 1px solid #e5e7eb;
  border-top-left-radius: 6px;
  border-bottom-left-radius: 6px;
}

.grid-item.no-gutter:last-child {
  border-top-right-radius: 6px;
  border-bottom-right-radius: 6px;
}

.demo-info {
  margin-top: 40px;
  padding: 20px;
  background: #f8f9fa;
  border: 1px solid #dee2e6;
  border-radius: 8px;
}

.demo-info h4 {
  margin: 0 0 16px 0;
  color: #333;
  font-size: 18px;
  font-weight: 600;
}

.demo-info ul {
  margin: 0;
  padding-left: 20px;
  color: #555;
}

.demo-info li {
  margin-bottom: 8px;
  line-height: 1.4;
}

.demo-info strong {
  color: #333;
}
```

```
        `,
    ],
})
export class GridBasicComponent {
  constructor() {
    console.log("Grid Basic Component initialized");
  }
}
```

## Alignment

Flexbox alignment utilities for controlling how items are positioned within containers.

```

<div class="grid-responsive-demo">
  <h3>Responsive Grid Layout</h3>

  <div class="demo-section">
    <h4>Responsive Column Classes</h4>
    <p>
      Grid columns that adapt to different screen sizes using
      breakpoint-specific classes.
    </p>

    <div class="container">
      <div class="row">
        <div class="col-12 col-sm-6 col-md-4 col-lg-3">
          <div class="grid-item responsive">
            <h5>Responsive Column</h5>
            <p>
              &lt;strong&gt;Mobile:&lt;/strong&gt; 12/12 (100%)&lt;br /&gt;
              &lt;strong&gt;Small:&lt;/strong&gt; 6/12 (50%)&lt;br /&gt;
              &lt;strong&gt;Medium:&lt;/strong&gt; 4/12 (33.33%)&lt;br /&gt;
              &lt;strong&gt;Large:&lt;/strong&gt; 3/12 (25%)
            </p>
          </div>
        </div>
        <div class="col-12 col-sm-6 col-md-4 col-lg-3">
          <div class="grid-item responsive">
            <h5>Responsive Column</h5>
            <p>
              &lt;strong&gt;Mobile:&lt;/strong&gt; 12/12 (100%)&lt;br /&gt;
              &lt;strong&gt;Small:&lt;/strong&gt; 6/12 (50%)&lt;br /&gt;
              &lt;strong&gt;Medium:&lt;/strong&gt; 4/12 (33.33%)&lt;br /&gt;
              &lt;strong&gt;Large:&lt;/strong&gt; 3/12 (25%)
            </p>
          </div>
        </div>
        <div class="col-12 col-sm-6 col-md-4 col-lg-3">
          <div class="grid-item responsive">
            <h5>Responsive Column</h5>
            <p>
              &lt;strong&gt;Mobile:&lt;/strong&gt; 12/12 (100%)&lt;br /&gt;
              &lt;strong&gt;Small:&lt;/strong&gt; 6/12 (50%)&lt;br /&gt;
              &lt;strong&gt;Medium:&lt;/strong&gt; 4/12 (33.33%)&lt;br /&gt;
              &lt;strong&gt;Large:&lt;/strong&gt; 3/12 (25%)
            </p>
          </div>
        </div>
        <div class="col-12 col-sm-6 col-md-4 col-lg-3">
          <div class="grid-item responsive">
            <h5>Responsive Column</h5>
            <p>
              &lt;strong&gt;Mobile:&lt;/strong&gt; 12/12 (100%)&lt;br /&gt;
              &lt;strong&gt;Small:&lt;/strong&gt; 6/12 (50%)&lt;br /&gt;
              &lt;strong&gt;Medium:&lt;/strong&gt; 4/12 (33.33%)&lt;br /&gt;
              &lt;strong&gt;Large:&lt;/strong&gt; 3/12 (25%)
            </p>
          </div>
        </div>
      </div>
    </div>
  </div>

```

```

    &lt;/p&gt;
    &lt;/div&gt;
    &lt;/div&gt;
    &lt;/div&gt;
    &lt;/div&gt;
    &lt;/div&gt;

&lt;div class="demo-section"&gt;
    &lt;h4&gt;Mobile-First Layout&lt;/h4&gt;
    &lt;p&gt;
        Layout that starts with mobile design and progressively enhances for
        larger screens.
    &lt;/p&gt;

    &lt;div class="container"&gt;
        &lt;div class="row"&gt;
            &lt;div class="col-12 col-md-8"&gt;
                &lt;div class="grid-item primary"&gt;
                    &lt;h5&gt;Main Content&lt;/h5&gt;
                    &lt;p&gt;
                        &lt;strong&gt;Mobile:&lt;/strong&gt; Full width (12/12)&lt;br /&gt;
                        &lt;strong&gt;Medium+:&lt;/strong&gt; 8/12 width
                    &lt;/p&gt;
                    &lt;p&gt;
                        This column takes full width on mobile devices and 8/12 width on
                        medium screens and larger.
                    &lt;/p&gt;
                &lt;/div&gt;
            &lt;/div&gt;
            &lt;div class="col-12 col-md-4"&gt;
                &lt;div class="grid-item secondary"&gt;
                    &lt;h5&gt;Sidebar&lt;/h5&gt;
                    &lt;p&gt;
                        &lt;strong&gt;Mobile:&lt;/strong&gt; Full width (12/12)&lt;br /&gt;
                        &lt;strong&gt;Medium+:&lt;/strong&gt; 4/12 width
                    &lt;/p&gt;
                    &lt;p&gt;
                        This sidebar appears below the main content on mobile and beside
                        it on larger screens.
                    &lt;/p&gt;
                &lt;/div&gt;
            &lt;/div&gt;
        &lt;/div&gt;
    &lt;/div&gt;

```

&lt;div class="demo-section"&gt;

&lt;h4&gt;Complex Responsive Layout&lt;/h4&gt;

&lt;p&gt;

Advanced responsive layout with different column configurations at each breakpoint.

&lt;/p&gt;

&lt;div class="container"&gt;

```

<div class="row">
    <div class="col-12 col-sm-6 col-lg-4">
        <div class="grid-item">
            <h5>Feature 1</h5>
            <p>
                <strong>Mobile:</strong> 12/12 (100%)<br />
                <strong>Small:</strong> 6/12 (50%)<br />
                <strong>Large:</strong> 4/12 (33.33%)
            </p>
        </div>
    </div>
    <div class="col-12 col-sm-6 col-lg-4">
        <div class="grid-item">
            <h5>Feature 2</h5>
            <p>
                <strong>Mobile:</strong> 12/12 (100%)<br />
                <strong>Small:</strong> 6/12 (50%)<br />
                <strong>Large:</strong> 4/12 (33.33%)
            </p>
        </div>
    </div>
    <div class="col-12 col-sm-12 col-lg-4">
        <div class="grid-item">
            <h5>Feature 3</h5>
            <p>
                <strong>Mobile:</strong> 12/12 (100%)<br />
                <strong>Small:</strong> 12/12 (100%)<br />
                <strong>Large:</strong> 4/12 (33.33%)
            </p>
        </div>
    </div>
</div>

<div class="demo-section">
    <h4>Responsive Navigation</h4>
    <p>Navigation layout that adapts to different screen sizes.</p>

    <div class="container">
        <div class="row align-items-center">
            <div class="col-12 col-md-3">
                <div class="grid-item nav-brand">
                    <h5>Brand Logo</h5>
                    <p>Always full width on mobile, 3/12 on medium+</p>
                </div>
            </div>
            <div class="col-12 col-md-9">
                <div class="grid-item nav-menu">
                    <h5>Navigation Menu</h5>
                    <p>Full width on mobile, 9/12 on medium+</p>
                </div>
                <div class="nav-items">
                    <span class="nav-item">Home</span>

```

```

        &lt;span class="nav-item"&gt;About&lt;/span&gt;
        &lt;span class="nav-item"&gt;Services&lt;/span&gt;
        &lt;span class="nav-item"&gt;Contact&lt;/span&gt;
    &lt;/div&gt;
    &lt;/div&gt;
    &lt;/div&gt;
    &lt;/div&gt;
    &lt;/div&gt;
    &lt;/div&gt;

&lt;div class="demo-section"&gt;
    &lt;h4&gt;Responsive Form Layout&lt;/h4&gt;
    &lt;p&gt;
        Form fields that stack on mobile and align side-by-side on larger screens.
    &lt;/p&gt;

    &lt;div class="container"&gt;
        &lt;div class="row"&gt;
            &lt;div class="col-12 col-sm-6"&gt;
                &lt;div class="grid-item form-field"&gt;
                    &lt;h5&gt;First Name&lt;/h5&gt;
                    &lt;p&gt;Full width on mobile, 6/12 on small+&lt;/p&gt;
                &lt;/div&gt;
            &lt;/div&gt;
            &lt;div class="col-12 col-sm-6"&gt;
                &lt;div class="grid-item form-field"&gt;
                    &lt;h5&gt;Last Name&lt;/h5&gt;
                    &lt;p&gt;Full width on mobile, 6/12 on small+&lt;/p&gt;
                &lt;/div&gt;
            &lt;/div&gt;
            &lt;div class="col-12"&gt;
                &lt;div class="grid-item form-field"&gt;
                    &lt;h5&gt;Email Address&lt;/h5&gt;
                    &lt;p&gt;Always full width across all screen sizes&lt;/p&gt;
                &lt;/div&gt;
            &lt;/div&gt;
            &lt;div class="col-12 col-md-8"&gt;
                &lt;div class="grid-item form-field"&gt;
                    &lt;h5&gt;Message&lt;/h5&gt;
                    &lt;p&gt;Full width on mobile, 8/12 on medium+&lt;/p&gt;
                &lt;/div&gt;
            &lt;/div&gt;
            &lt;div class="col-12 col-md-4"&gt;
                &lt;div class="grid-item form-field"&gt;
                    &lt;h5&gt;Submit&lt;/h5&gt;
                    &lt;p&gt;Full width on mobile, 4/12 on medium+&lt;/p&gt;
                &lt;/div&gt;
            &lt;/div&gt;
        &lt;/div&gt;
    &lt;/div&gt;
    &lt;/div&gt;
    &lt;/div&gt;

&lt;div class="demo-info"&gt;

```

```

<h4>Responsive Grid Features</h4>
<ul>
  <li>
    <strong>Mobile-First:</strong> Design for mobile devices first, then
    enhance for larger screens
  </li>
  <li>
    <strong>Breakpoint Classes:</strong> Use <code>.col-sm-*</code>, <code>.col-md-*</code>, <code>.col-lg-*</code>, <code>.col-xl-*</code>
  </li>
  <li>
    <strong>Progressive Enhancement:</strong> Start with basic layout, add
    complexity for larger screens
  </li>
  <li>
    <strong>Content Priority:</strong> Ensure important content is visible
    on all screen sizes
  </li>
  <li>
    <strong>Touch Optimization:</strong> Layouts are optimized for touch
    interaction on mobile
  </li>
</ul>

<h4>Breakpoint Reference</h4>
<ul>
  <li>
    <strong>Extra Small (xs):</strong> 0px and up (default, no prefix)
  </li>
  <li>
    <strong>Small (sm):</strong> 576px and up</li>
  <li>
    <strong>Medium (md):</strong> 768px and up</li>
  <li>
    <strong>Large (lg):</strong> 992px and up</li>
  <li>
    <strong>Extra Large (xl):</strong> 1200px and up</li>
</ul>
</div>
</div>

```

## Ordering

CSS order utilities for controlling the visual order of flex items.

```

import { Component } from "@angular/core";

@Component({
  selector: "app-grid-responsive",
  standalone: true,
  template: `
    <div class="grid-responsive-demo">
      <h3>Responsive Grid Layout</h3>

      <div class="demo-section">
        <h4>Responsive Column Classes</h4>
        <p>
          Grid columns that adapt to different screen sizes using
          breakpoint-specific classes.
        </p>

        <div class="container">
          <div class="row">
            <div class="col-12 col-sm-6 col-md-4 col-lg-3">
              <div class="grid-item responsive">
                <h5>Responsive Column</h5>
                <p>
                  <strong>Mobile:</strong> 12/12 (100%)<br />
                  <strong>Small:</strong> 6/12 (50%)<br />
                  <strong>Medium:</strong> 4/12 (33.33%)<br />
                  <strong>Large:</strong> 3/12 (25%)
                </p>
              </div>
            </div>
            <div class="col-12 col-sm-6 col-md-4 col-lg-3">
              <div class="grid-item responsive">
                <h5>Responsive Column</h5>
                <p>
                  <strong>Mobile:</strong> 12/12 (100%)<br />
                  <strong>Small:</strong> 6/12 (50%)<br />
                  <strong>Medium:</strong> 4/12 (33.33%)<br />
                  <strong>Large:</strong> 3/12 (25%)
                </p>
              </div>
            </div>
            <div class="col-12 col-sm-6 col-md-4 col-lg-3">
              <div class="grid-item responsive">
                <h5>Responsive Column</h5>
                <p>
                  <strong>Mobile:</strong> 12/12 (100%)<br />
                  <strong>Small:</strong> 6/12 (50%)<br />
                  <strong>Medium:</strong> 4/12 (33.33%)<br />
                  <strong>Large:</strong> 3/12 (25%)
                </p>
              </div>
            </div>
          </div>
        </div>
      </div>
    </div>
  `
```

```

<h5>Responsive Column</h5>
<p>
    <strong>Mobile:</strong> 12/12 (100%)<br />
    <strong>Small:</strong> 6/12 (50%)<br />
    <strong>Medium:</strong> 4/12 (33.33%)<br />
    <strong>Large:</strong> 3/12 (25%)
</p>
</div>
</div>
</div>
</div>

<div class="demo-section">
<h4>Mobile-First Layout</h4>
<p>
    Layout that starts with mobile design and progressively enhances for
    larger screens.
</p>

<div class="container">
    <div class="row">
        <div class="col-12 col-md-8">
            <div class="grid-item primary">
                <h5>Main Content</h5>
                <p>
                    <strong>Mobile:</strong> Full width (12/12)<br />
                    <strong>Medium+:</strong> 8/12 width
                </p>
                <p>
                    This column takes full width on mobile devices and 8/12 width
                    on medium screens and larger.
                </p>
            </div>
            <div class="grid-item secondary">
                <h5>Sidebar</h5>
                <p>
                    <strong>Mobile:</strong> Full width (12/12)<br />
                    <strong>Medium+:</strong> 4/12 width
                </p>
                <p>
                    This sidebar appears below the main content on mobile and
                    beside it on larger screens.
                </p>
            </div>
        </div>
        <div class="col-12 col-md-4">
            <div class="grid-item secondary">
                <h5>Sidebar</h5>
                <p>
                    <strong>Mobile:</strong> Full width (12/12)<br />
                    <strong>Medium+:</strong> 4/12 width
                </p>
                <p>
                    This sidebar appears below the main content on mobile and
                    beside it on larger screens.
                </p>
            </div>
        </div>
    </div>
</div>
</div>

<div class="demo-section">

```

```

<h4>Complex Responsive Layout</h4>
<p>
    Advanced responsive layout with different column configurations at
    each breakpoint.
</p>

<div class="container">
    <div class="row">
        <div class="col-12 col-sm-6 col-lg-4">
            <div class="grid-item">
                <h5>Feature 1</h5>
                <p>
                    <strong>Mobile:</strong> 12/12 (100%)<br />
                    <strong>Small:</strong> 6/12 (50%)<br />
                    <strong>Large:</strong> 4/12 (33.33%)<br />
                </p>
            </div>
        </div>
        <div class="col-12 col-sm-6 col-lg-4">
            <div class="grid-item">
                <h5>Feature 2</h5>
                <p>
                    <strong>Mobile:</strong> 12/12 (100%)<br />
                    <strong>Small:</strong> 6/12 (50%)<br />
                    <strong>Large:</strong> 4/12 (33.33%)<br />
                </p>
            </div>
        </div>
        <div class="col-12 col-sm-12 col-lg-4">
            <div class="grid-item">
                <h5>Feature 3</h5>
                <p>
                    <strong>Mobile:</strong> 12/12 (100%)<br />
                    <strong>Small:</strong> 12/12 (100%)<br />
                    <strong>Large:</strong> 4/12 (33.33%)<br />
                </p>
            </div>
        </div>
    </div>
</div>

<div class="demo-section">
    <h4>Responsive Navigation</h4>
    <p>Navigation layout that adapts to different screen sizes.</p>

    <div class="container">
        <div class="row align-items-center">
            <div class="col-12 col-md-3">
                <div class="grid-item nav-brand">
                    <h5>Brand Logo</h5>
                    <p>Always full width on mobile, 3/12 on medium+</p>
                </div>
            </div>
        </div>
    </div>
</div>

```

```

</div>
<div class="col-12 col-md-9">
    <div class="grid-item nav-menu">
        <h5>Navigation Menu</h5>
        <p>Full width on mobile, 9/12 on medium+</p>
        <div class="nav-items">
            <span class="nav-item">Home</span>
            <span class="nav-item">About</span>
            <span class="nav-item">Services</span>
            <span class="nav-item">Contact</span>
        </div>
    </div>
    <div>
        <div>
            <div>
                <div>
                    <div>
                        <div>
                            <div>
                                <div>
                                    <div>
                                        <div>
                                            <div>
                                                <div>
                                                    <div>
                                                        <div>
                                                            <div>
                                                                <div>
                                                                    <div>
                                                                        <div>
                                                                            <div>
                                                                                <div>
                                                                                    <div>
                                                                                        <div>
                                                                                            <div>
                                                                                                <div>
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                                                                                                            <div>
                                                                                                                <div>
                                                                                                                    <div>
                                                                                                                        <div>
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                                                                                                                                <div>
                                                                                                                                    <div>
                                                                                                                                        <div>
                                                                                                                                            <div>
                                                                                                                                                <div>
                                                                                                                                                    <div>
                                                                ................................................................

```

```

        &lt;p&gt;Full width on mobile, 4/12 on medium+&lt;/p&gt;
        &lt;/div&gt;
        &lt;/div&gt;
        &lt;/div&gt;
        &lt;/div&gt;
        &lt;/div&gt;

&lt;div class="demo-info"&gt;
    &lt;h4&gt;Responsive Grid Features&lt;/h4&gt;
    &lt;ul&gt;
        &lt;li&gt;
            &lt;strong&gt;Mobile-First:&lt;/strong&gt; Design for mobile devices first, then
            enhance for larger screens
        &lt;/li&gt;
        &lt;li&gt;
            &lt;strong&gt;Breakpoint Classes:&lt;/strong&gt; Use &lt;code&gt;.col-sm-*&lt;/code&gt;,
            &lt;code&gt;.col-md-*&lt;/code&gt;, &lt;code&gt;.col-lg-*&lt;/code&gt;,
            &lt;code&gt;.col-xl-*&lt;/code&gt;
        &lt;/li&gt;
        &lt;li&gt;
            &lt;strong&gt;Progressive Enhancement:&lt;/strong&gt; Start with basic layout,
            add complexity for larger screens
        &lt;/li&gt;
        &lt;li&gt;
            &lt;strong&gt;Content Priority:&lt;/strong&gt; Ensure important content is
            visible on all screen sizes
        &lt;/li&gt;
        &lt;li&gt;
            &lt;strong&gt;Touch Optimization:&lt;/strong&gt; Layouts are optimized for touch
            interaction on mobile
        &lt;/li&gt;
    &lt;/ul&gt;

    &lt;h4&gt;Breakpoint Reference&lt;/h4&gt;
    &lt;ul&gt;
        &lt;li&gt;
            &lt;strong&gt;Extra Small (xs):&lt;/strong&gt; 0px and up (default, no prefix)
        &lt;/li&gt;
        &lt;li&gt;&lt;strong&gt;Small (sm):&lt;/strong&gt; 576px and up&lt;/li&gt;
        &lt;li&gt;&lt;strong&gt;Medium (md):&lt;/strong&gt; 768px and up&lt;/li&gt;
        &lt;li&gt;&lt;strong&gt;Large (lg):&lt;/strong&gt; 992px and up&lt;/li&gt;
        &lt;li&gt;&lt;strong&gt;Extra Large (xl):&lt;/strong&gt; 1200px and up&lt;/li&gt;
    &lt;/ul&gt;
    &lt;/div&gt;
&lt;/div&gt;

``,
styles: [
```
.grid-responsive-demo {
    padding: 20px;
    max-width: 1200px;
    margin: 0 auto;
}

```

```
.grid-responsive-demo h3 {
  margin: 0 0 20px 0;
  color: #333;
  font-size: 24px;
  font-weight: 600;
}

.demo-section {
  margin-bottom: 40px;
  padding: 20px;
  border: 1px solid #e5e7eb;
  border-radius: 8px;
  background: #f9fafb;
}

.demo-section h4 {
  margin: 0 0 12px 0;
  color: #333;
  font-size: 18px;
  font-weight: 600;
}

.demo-section p {
  margin: 0 0 20px 0;
  color: #555;
  line-height: 1.5;
}

.demo-section code {
  background: #f1f3f4;
  padding: 2px 6px;
  border-radius: 4px;
  font-family: monospace;
  font-size: 14px;
}

.grid-item {
  background: #fff;
  border: 1px solid #e5e7eb;
  border-radius: 6px;
  padding: 20px;
  height: 100%;
  min-height: 120px;
  display: flex;
  flex-direction: column;
  justify-content: center;
}

.grid-item h5 {
  margin: 0 0 12px 0;
  color: #333;
  font-size: 16px;
  font-weight: 600;
```

```
}

.grid-item p {
  margin: 0;
  color: #666;
  line-height: 1.4;
}

.grid-item.responsive {
  background: #fff3cd;
  border-color: #ffc107;
}

.grid-item.primary {
  background: #e3f2fd;
  border-color: #2196f3;
}

.grid-item.secondary {
  background: #f3e5f5;
  border-color: #9c27b0;
}

.grid-item.nav-brand {
  background: #e8f5e8;
  border-color: #4caf50;
  min-height: 80px;
}

.grid-item.nav-menu {
  background: #fff8e1;
  border-color: #ff9800;
  min-height: 80px;
}

.nav-items {
  display: flex;
  gap: 15px;
  margin-top: 10px;
}

.nav-item {
  background: #ff9800;
  color: white;
  padding: 5px 10px;
  border-radius: 4px;
  font-size: 14px;
}

.grid-item.form-field {
  background: #f8f9fa;
  border-color: #6c757d;
  min-height: 100px;
}
```

```

        }

.demo-info {
  margin-top: 40px;
  padding: 20px;
  background: #f8f9fa;
  border: 1px solid #dee2e6;
  border-radius: 8px;
}

.demo-info h4 {
  margin: 0 0 16px 0;
  color: #333;
  font-size: 18px;
  font-weight: 600;
}

.demo-info ul {
  margin: 0 0 20px 0;
  padding-left: 20px;
  color: #555;
}

.demo-info li {
  margin-bottom: 8px;
  line-height: 1.4;
}

.demo-info strong {
  color: #333;
}

),
],
})
export class GridResponsiveComponent {
  constructor() {
    console.log("Grid Responsive Component initialized");
  }
}

```

## Features

### Container System

- Fixed Container : .container with responsive max-widths
- Fluid Container : .container-fluid for full-width layouts
- Responsive Breakpoints : Automatic width adjustments at different screen sizes
- Consistent Padding : 15px horizontal padding on all containers

# Row System

- Flexbox Rows : .row creates flex containers with wrap enabled
- Negative Margins : Automatic gutter compensation with -15px margins
- No Gutters : .no-gutters class removes spacing between columns
- Responsive Behavior : Consistent behavior across all breakpoints

# Column System

- 12-Column Grid : Standard 12-column layout system
- Responsive Classes : Breakpoint-specific column classes (sm, md, lg, xl)
- Auto Columns : .col and .col-auto for flexible sizing
- Fixed Widths : Classes from .col-1 to .col-12 for precise control

# Breakpoint System

- Extra Small (xs) : Default, no prefix (0px and up)
- Small (sm) : 576px and up
- Medium (md) : 768px and up
- Large (lg) : 992px and up
- Extra Large (xl) : 1200px and up

# Flexbox Utilities

- Direction : Row, column, and reverse variants
- Wrap : Wrap, nowrap, and wrap-reverse options
- Justify Content : Start, end, center, between, around
- Align Items : Start, end, center, baseline, stretch
- Align Content : Start, end, center, between, around, stretch
- Align Self : Auto, start, end, center, baseline, stretch

# Positioning Utilities

- Offsets : .offset-\* classes for column positioning
- Push/Pull : .push-\* and .pull-\* for reordering
- Order : .order-\* classes for flex item ordering
- Responsive Variants : All utilities available at each breakpoint

# CSS Classes

# Container Classes

| Class            | Description                                       |
|------------------|---------------------------------------------------|
| .container       | Fixed-width container with responsive max-widths  |
| .container-fluid | Full-width container spanning the entire viewport |

# Row Classes

| Class       | Description                              |
|-------------|------------------------------------------|
| .row        | Flexbox row container with wrap enabled  |
| .no-gutters | Removes gutters from row and its columns |

# Column Classes

## Basic Columns

| Class     | Width   | Description                                 |
|-----------|---------|---------------------------------------------|
| .col      | Auto    | Equal-width column that grows to fill space |
| .col-auto | Auto    | Column sized to content                     |
| .col-1    | 8.333%  | 1/12 width column                           |
| .col-2    | 16.667% | 2/12 width column                           |
| .col-3    | 25%     | 3/12 width column                           |
| .col-4    | 33.333% | 4/12 width column                           |
| .col-5    | 41.667% | 5/12 width column                           |
| .col-6    | 50%     | 6/12 width column                           |
| .col-7    | 58.333% | 7/12 width column                           |
| .col-8    | 66.667% | 8/12 width column                           |

| Class   | Width   | Description        |
|---------|---------|--------------------|
| .col-9  | 75%     | 9/12 width column  |
| .col-10 | 83.333% | 10/12 width column |
| .col-11 | 91.667% | 11/12 width column |
| .col-12 | 100%    | Full-width column  |

## Responsive Columns

| Class     | Breakpoint | Description                |
|-----------|------------|----------------------------|
| .col-sm-* | ≥576px     | Small screen columns       |
| .col-md-* | ≥768px     | Medium screen columns      |
| .col-lg-* | ≥992px     | Large screen columns       |
| .col-xl-* | ≥1200px    | Extra large screen columns |

## Flexbox Direction Classes

| Class                | Description                    |
|----------------------|--------------------------------|
| .flex-row            | Horizontal direction (default) |
| .flex-column         | Vertical direction             |
| .flex-row-reverse    | Horizontal direction, reversed |
| .flex-column-reverse | Vertical direction, reversed   |

## Flexbox Wrap Classes

| Class              | Description                      |
|--------------------|----------------------------------|
| .flex-wrap         | Allow items to wrap to next line |
| .flexnowrap        | Prevent wrapping (default)       |
| .flex-wrap-reverse | Wrap items in reverse order      |

## Justify Content Classes

| Class                    | Description                    |
|--------------------------|--------------------------------|
| .justify-content-start   | Align items to start           |
| .justify-content-end     | Align items to end             |
| .justify-content-center  | Center items                   |
| .justify-content-between | Space items evenly             |
| .justify-content-around  | Space items with equal margins |

## Align Items Classes

| Class                 | Description             |
|-----------------------|-------------------------|
| .align-items-start    | Align items to start    |
| .align-items-end      | Align items to end      |
| .align-items-center   | Center items            |
| .align-items-baseline | Align items to baseline |
| .align-items-stretch  | Stretch items (default) |

## Align Content Classes

| Class                  | Description                      |
|------------------------|----------------------------------|
| .align-content-start   | Align content to start           |
| .align-content-end     | Align content to end             |
| .align-content-center  | Center content                   |
| .align-content-between | Space content evenly             |
| .align-content-around  | Space content with equal margins |
| .align-content-stretch | Stretch content (default)        |

## Align Self Classes

| Class            | Description              |
|------------------|--------------------------|
| .align-self-auto | Auto alignment (default) |

| Class                | Description            |
|----------------------|------------------------|
| .align-self-start    | Align self to start    |
| .align-self-end      | Align self to end      |
| .align-self-center   | Center self            |
| .align-self-baseline | Align self to baseline |
| .align-self-stretch  | Stretch self           |

## Order Classes

| Class        | Description |
|--------------|-------------|
| .order-first | Order: -1   |
| .order-last  | Order: 13   |
| .order-1     | Order: 1    |
| .order-2     | Order: 2    |
| .order-3     | Order: 3    |

## Offset Classes

| Class      | Margin Left | Description          |
|------------|-------------|----------------------|
| .offset-1  | 8.333%      | Offset by 1 column   |
| .offset-2  | 16.667%     | Offset by 2 columns  |
| .offset-3  | 25%         | Offset by 3 columns  |
| .offset-4  | 33.333%     | Offset by 4 columns  |
| .offset-5  | 41.667%     | Offset by 5 columns  |
| .offset-6  | 50%         | Offset by 6 columns  |
| .offset-7  | 58.333%     | Offset by 7 columns  |
| .offset-8  | 66.667%     | Offset by 8 columns  |
| .offset-9  | 75%         | Offset by 9 columns  |
| .offset-10 | 83.333%     | Offset by 10 columns |

| Class      | Margin Left | Description          |
|------------|-------------|----------------------|
| .offset-11 | 91.667%     | Offset by 11 columns |

## Push/Pull Classes

| Class   | Description               |
|---------|---------------------------|
| .push-* | Push columns to the right |
| .pull-* | Pull columns to the left  |

## CSS Custom Properties

The Grid system uses standard CSS properties and doesn't rely on CSS custom properties. However, it's designed to work seamlessly with CSS custom properties for theming:

| Property               | Description            | Default                        |
|------------------------|------------------------|--------------------------------|
| --grid-gutter-width    | Width of grid gutters  | 30px                           |
| --grid-columns         | Number of grid columns | 12                             |
| --container-max-widths | Container max-widths   | 540px, 720px, 960px,<br>1140px |
| --grid-breakpoints     | Breakpoint values      | 576px, 768px, 992px,<br>1200px |

## Best Practices

### Layout Structure

- Container First : Always start with a container ( .container or .container-fluid )
- Row Wrapper : Wrap columns in a .row element
- Column Classes : Use appropriate column classes for desired widths
- Responsive Design : Use breakpoint-specific classes for mobile-first design

### Responsive Design

- Mobile First : Design for mobile devices first, then enhance for larger screens

- Breakpoint Strategy : Use consistent breakpoints across your application
- Progressive Enhancement : Start with basic layout, add complexity for larger screens
- Content Priority : Ensure important content is visible on all screen sizes

## Performance

- CSS Efficiency : Grid classes are optimized for performance
- Minimal Nesting : Avoid deeply nested grid structures when possible
- Semantic HTML : Use semantic HTML elements with grid classes
- Browser Support : Grid system works in all modern browsers

## Accessibility

- Logical Order : Ensure content flows logically regardless of visual order
- Screen Readers : Grid layout doesn't affect screen reader navigation
- Keyboard Navigation : Maintain logical tab order
- Focus Management : Ensure focus indicators are visible

## Content Organization

- Consistent Spacing : Use consistent gutters and spacing
- Content Hierarchy : Use grid to establish clear visual hierarchy
- Flexible Content : Design content to work across different column widths
- Responsive Images : Ensure images scale appropriately within grid columns

## Accessibility Guidelines

## Semantic Structure

- HTML Semantics : Use semantic HTML elements with grid classes
- Document Outline : Ensure proper heading hierarchy within grid layouts
- Landmark Roles : Use appropriate ARIA landmarks for major layout sections
- Content Flow : Maintain logical content flow regardless of visual layout

## Screen Reader Support

- Logical Order : Content should flow logically for screen readers
- Descriptive Labels : Use descriptive labels for interactive elements
- Skip Links : Provide skip links for navigation-heavy layouts
- Focus Indicators : Ensure focus indicators are visible and logical

# Keyboard Navigation

- Tab Order : Maintain logical tab order through grid layouts
- Focus Management : Ensure focus moves logically through content
- Keyboard Shortcuts : Provide keyboard shortcuts for complex layouts
- Escape Mechanisms : Allow users to escape from complex layouts

# Visual Design

- High Contrast : Ensure sufficient contrast ratios in grid layouts
- Color Independence : Don't rely solely on color for information
- Text Scaling : Support for text scaling and zoom
- Motion Sensitivity : Provide alternatives for users sensitive to motion

# Responsive Behavior

## Mobile Adaptations

The Grid system automatically adapts to mobile screens:

- Stacked Layout : Columns stack vertically on small screens
- Full Width : Single columns take full width on mobile
- Touch Optimization : Layouts are optimized for touch interaction
- Performance : Optimized performance for mobile devices

## Breakpoint Behavior

- Extra Small (0px+) : Single column layout, stacked content
- Small (576px+) : Multi-column layouts begin to appear
- Medium (768px+) : Tablet-optimized layouts
- Large (992px+) : Desktop layouts with full feature set
- Extra Large (1200px+) : Large desktop and wide screen layouts

## Content Considerations

- Flexible Images : Images scale appropriately within grid columns
- Text Readability : Text remains readable at all column widths
- Touch Targets : Interactive elements maintain appropriate touch target sizes
- Loading Performance : Layouts load efficiently on all devices